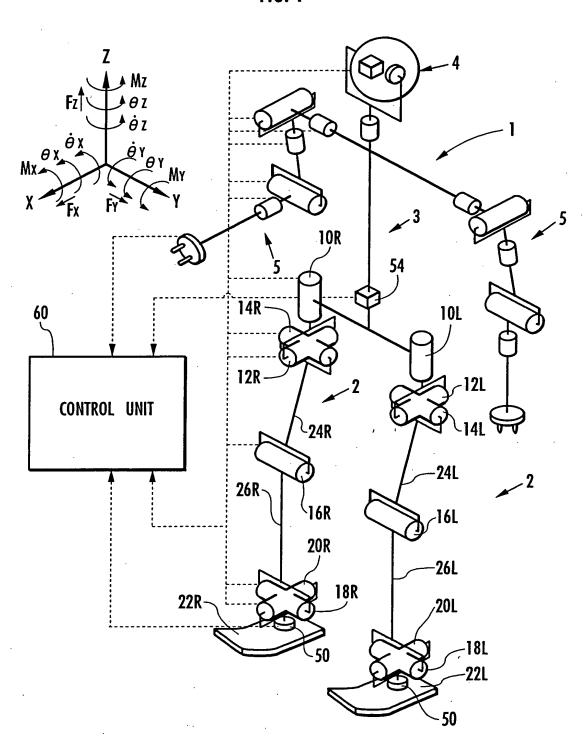
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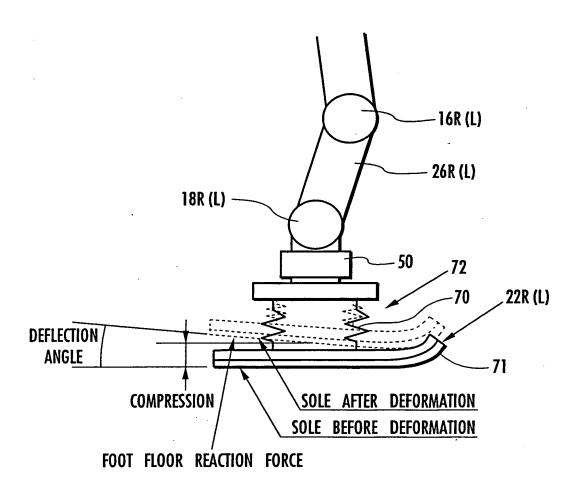
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FIG. 1



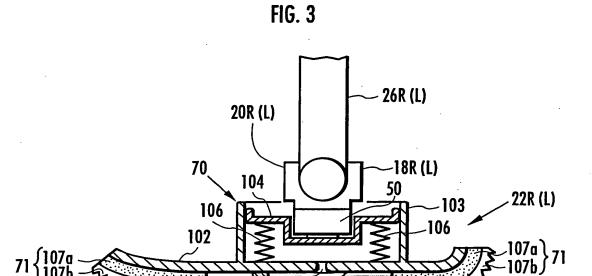
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FIG. 2



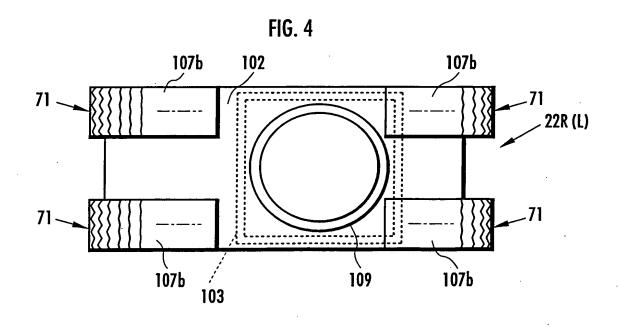
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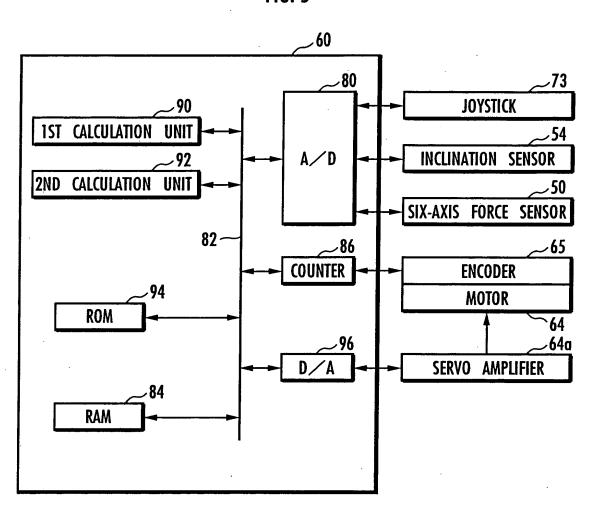
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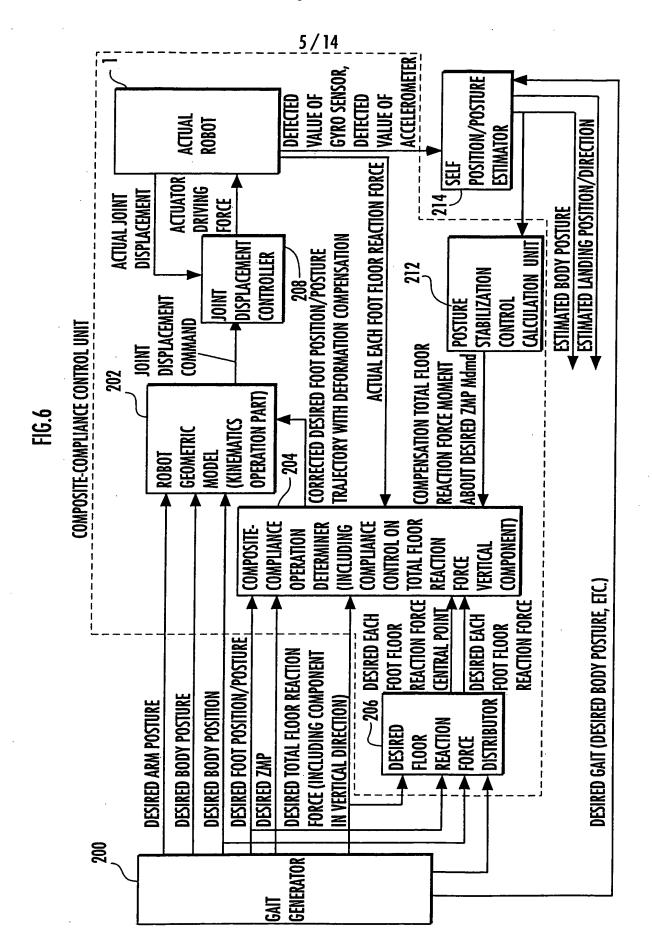


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FIG. 5



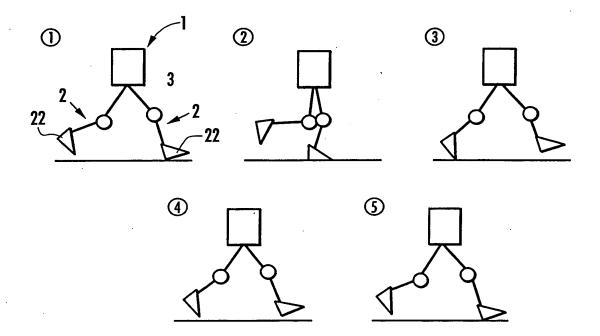
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FIG. 7



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FIG.8 (a)

FLOOR REACTION FORCE VERTICAL COMPONENT

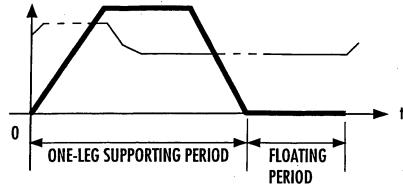


FIG.8 (b)

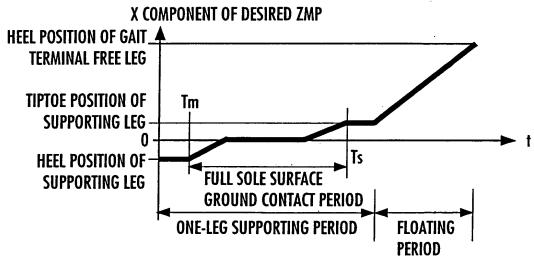
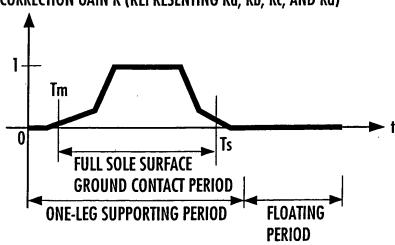
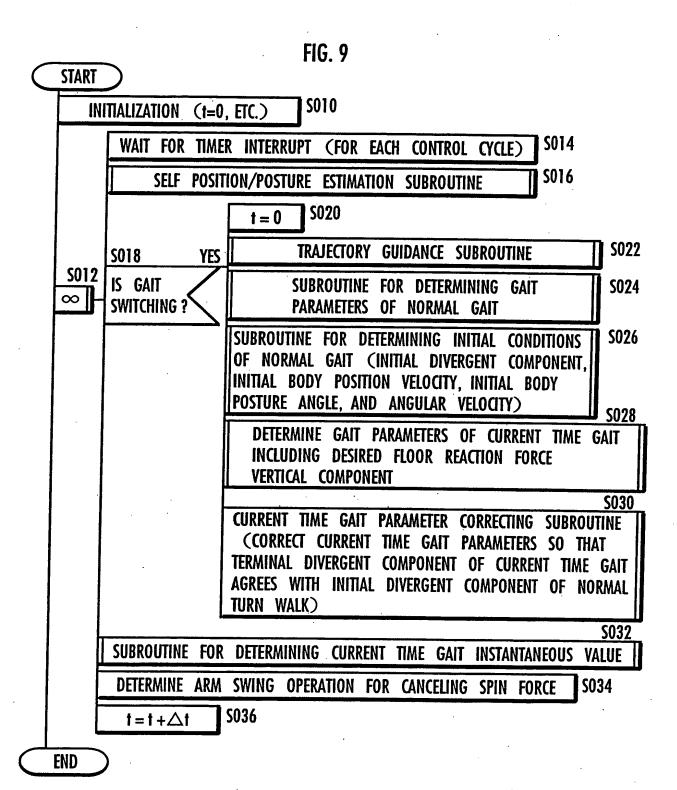


FIG.8 (c)
CORRECTION GAIN K (REPRESENTING Ka, Kb, Kc, AND Kd)



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START

FIG. 10

INTEGRATE DETECTED VALUE OF GYRO SENSOR TO DETERMINE ESTIMATED BODY POSTURE. USE MOTIONAL ACCELERATION CALCULATED FROM MOTION AT GEOMETRICALLY ESTIMATED BODY POSITION DETERMINED IN PREVIOUS CONTROL CYCLE AND DETECTED VALUE OF ACCELEROMETER TO CORRECT DETECTION DRIFT OF GYRO SENSOR, AND CORRECT DRIFT OF INCLINATION COMPONENT IN ESTIMATED BODY POSTURE. PERFORM YAW CORRECTION, DEPENDING ON SITUATIONS.

CALCULATE DIFFERENCE BETWEEN VARIATION IN ESTIMATED BODY POSTURE OBSERVED FROM GLOBAL COORDINATE SYSTEM BETWEEN CONTROL CYCLES AND VARIATION IN BODY POSTURE OF DESIRED GAIT OBSERVED FROM GLOBAL COORDINATE SYSTEM (VARIATION IN POSTURE ROTATION ERROR)

DETERMINE POSTURE ROTATIONAL CENTER

S2204

S2206

S2202

S2200

DETERMINE POSITION/POSTURE BY ROTATING CURRENT ESTIMATED SUPPORTING LEG COORDINATE SYSTEM ABOUT THE POSTURE ROTATIONAL CENTER BY THE DIFFERENCE (VARIATION IN POSTURE ROTATIONAL ERROR) TO OBTAIN UPDATED CURRENT ESTIMATED SUPPORTING LEG COORDINATE SYSTEM.

S2210

S2208 YES

DETERMINE NEXT TIME GAIT'S ESTIMATED SUPPORTING LEG COORDINATE SYSTEM SUCH THAT RELATIVE POSITION/POSTURE RELATIONSHIP OF NEXT TIME GAIT'S ESTIMATED SUPPORTING LEG COORDINATE SYSTEM WITH RESPECT TO CURRENT ESTIMATED SUPPORTING LEG COORDINATE SYSTEM IS IDENTICAL TO RELATIVE POSITION/POSTURE RELATIONSHIP OF NEXT TIME GAIT'S SUPPORTING LEG COORDINATE SYSTEM WITH RESPECT TO SUPPORTING LEG COORDINATE SYSTEM IN DESIRED GAIT.

SUBSTITUTE POSITION/POSTURE OF NEXT TIME GAIT'S ESTIMATED SUPPORTING LEG COORDINATE SYSTEM IN POSITION/POSTURE OF CURRENT ESTIMATED SUPPORTING LEG COORDINATE SYSTEM.

S2212

DETERMINE ESTIMATED BODY POSITION ON THE BASIS OF POSITION/POSTURE OF CURRENT ESTIMATED SUPPORTING LEG COORDINATE SYSTEM.

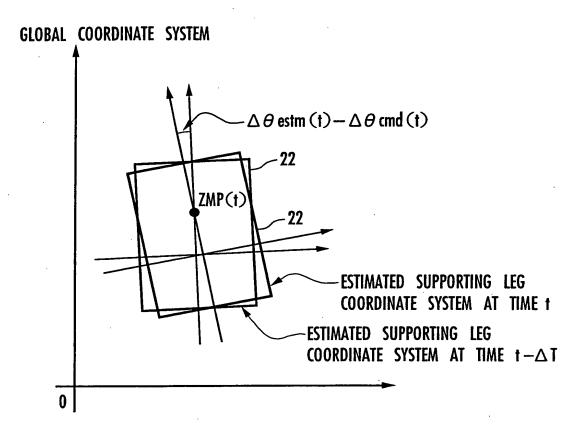
S2214 S2216

CORRECT INERTIAL-NAVIGATION-LIKE BODY POSITION SO THAT DIFFERENCE BETWEEN GEOMETRICALLY ESTIMATED BODY POSITION AND INERTIAL-NAVIGATION-LIKE ESTIMATED BODY POSITION CONVERGES TO ZERO, WHILE DETERMINING INERTIAL-NAVIGATION-LIKE ESTIMATED BODY POSITION/POSTURE ACCORDING TO INERTIAL NAVIGATION BY ACCELEROMETER AND GYRO SENSOR.

RETURN

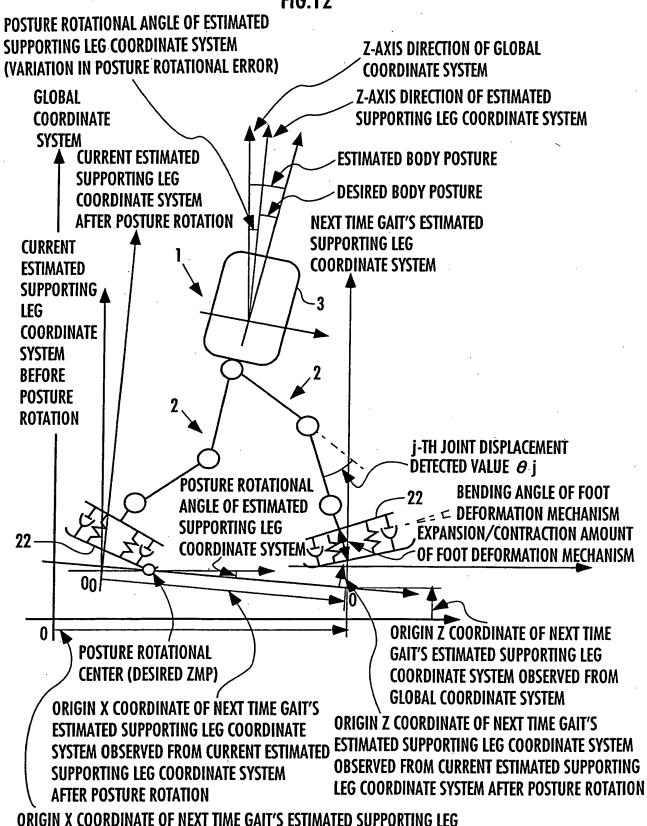
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FIG. 11



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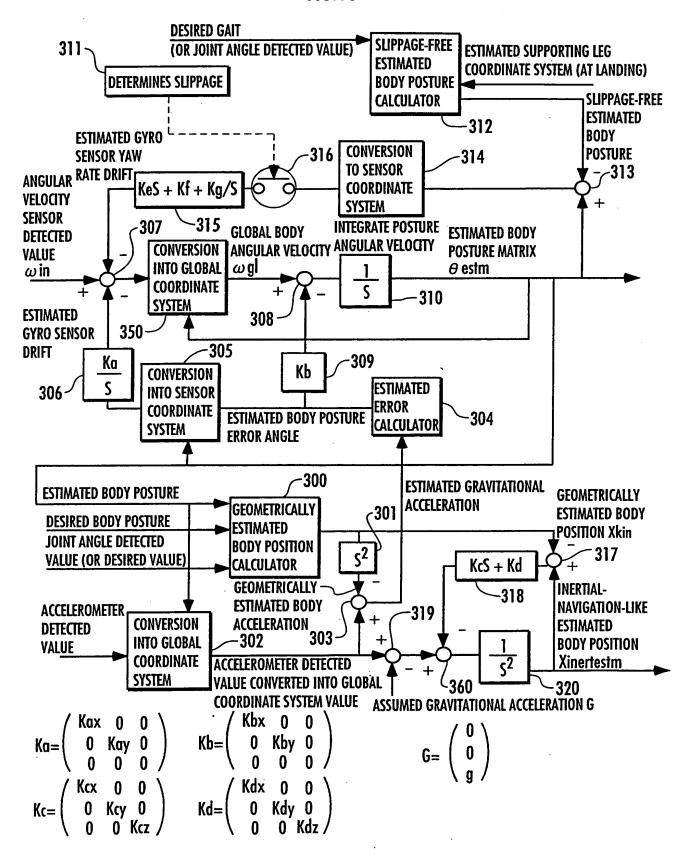




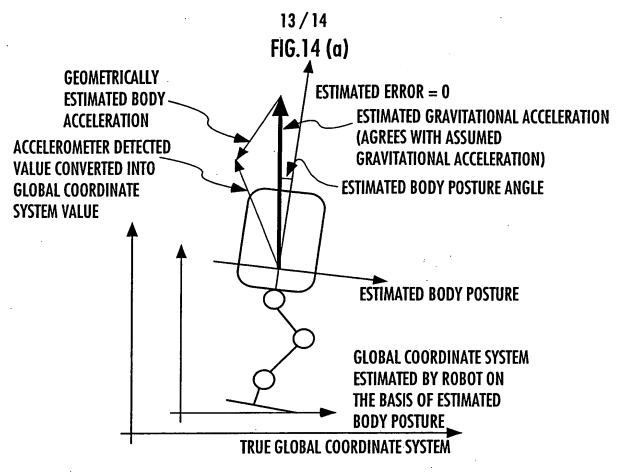
COORDINATE SYSTEM OBSERVED FROM GLOBAL COORDINATE SYSTEM

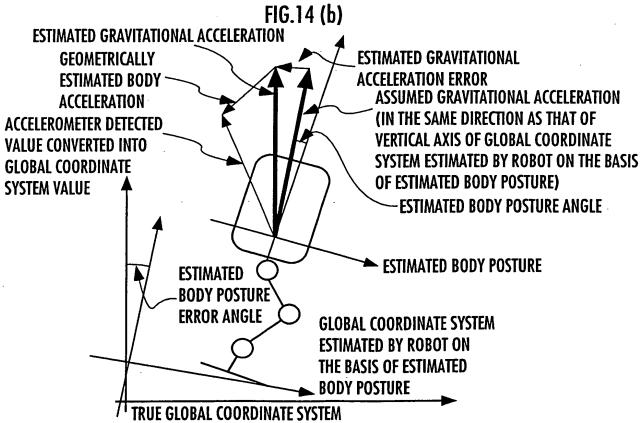
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FIG. 15

